

We claim:

1. A signal processor for multiple gradations for replacing one field with a plurality of subfields weighted with a predetermined luminance and coding a lit or unlit state of each display cell on a subfield basis  
5 in an input image signal having a predetermined number of gradations for each primary color, the processor comprising: a main path for generating a primary color signal having a first number of gradations from a primary  
10 color signal of an input image signal having the predetermined number of gradations, the first number of gradations being equal to or smaller than the predetermined number of gradations; a sub-path for generating a primary color signal having a second number  
15 of gradations, the second number of gradations being smaller than the first number of gradations; a switch for switching so that either of the signal generated by the main path and the signal generated by the sub-path is output; a movement detection circuit for detecting a  
20 moving area and the amount of movement by detecting the change in a primary color signal on a pixel basis between the current field and the preceding field of the input image signal; a level detection circuit for detecting and outputting the amount of level indicating the tendency  
25 for a moving image false contour to occur on a pixel basis for each primary color signal in the main path; a path switching control circuit for switching the switch from the main path output to the sub-path output based on the detected amount of movement and amount of level;  
30 plural subfield coding circuits for receiving the signal output from the switch thereto and for outputting a converted signal by carrying out different subfield coding, respectively; a superposing circuit for receiving the output of the plural subfield coding circuits thereto  
35 and selecting one of the input signals; and a superposing control circuit for controlling the selection of the output of the plural subfield coding circuits in the

superposing circuit for each primary color signal on a pixel basis.

2. A signal processor for multiple gradations, as set forth in claim 1, wherein the superposing control  
5 circuits judges whether the superposing process is carried out for each primary color signal on a pixel basis is judged when the detected amount of movement is equal to or larger than a first amount of movement and when the superposing process is carried out, the  
10 selection of the plural subfield coding circuits in the superposing circuit is changed sequentially and when the superposing process is not carried out, the selection is controlled so that the output of a predetermined subfield coding circuit is selected in the superposing circuit.

15 3. A signal processor for multiple gradations, as set forth in claim 1, wherein the superposing control circuits judges whether the superposing process is carried out for each primary color signal on a pixel basis is judged when the detected amount of movement is  
20 equal to or smaller than a predetermined amount of movement and when the superposing process is carried out, the selection of the plural subfield coding circuits in the superposing circuit is changed sequentially and when the superposing process is not carried out, the selection  
25 is controlled so that the output of a predetermined subfield coding circuit is selected in the superposing circuit.

4. A signal processor for multiple gradations, as set forth in claim 1, wherein the superposing control  
30 circuits judges whether the superposing process is carried out for each primary color signal on a pixel basis is judged when the amount of level is equal to or larger than a predetermined amount of level and when the superposing process is carried out, the selection of the  
35 plural subfield coding circuits in the superposing circuit is changed sequentially and when the superposing process is not carried out, the selection is controlled

so that the output of a predetermined subfield coding circuit is selected in the superposing circuit.

5        5.    A signal processor for multiple gradations, as set forth in claim 1, wherein the superposing control  
circuits judges whether the superposing process is  
carried out for each primary color signal on a pixel  
basis is judged when the detected amount of movement is  
equal to or larger than a first amount of movement and,  
at the same time, the amount of level is equal to or  
10    larger than a predetermined amount of level and when the  
superposing process is carried out, the selection of the  
plural subfield coding circuits in the superposing  
circuit is changed sequentially and when the superposing  
process is not carried out, the selection is controlled  
15    so that the output of a predetermined subfield coding  
circuit is selected in the superposing circuit.

6.    A signal processor for multiple gradations, as set forth in claim 2 or 5, wherein the superposing  
control circuit controls so that the superposing process  
is not carried out when the detected amount of movement  
20    is equal to or larger a second amount of movement, which  
is larger than the first amount of movement.

7.    A signal processor for multiple gradations, as set forth in claim 1, wherein the path switching control  
25    circuit switches the switch to the sub-path output when  
the amount of level is equal to or larger than a  
predetermined amount of level and, at the same time, the  
detected amount of movement is larger than a first amount  
of movement.

30        8.    A signal processor for multiple gradations, as set forth in claim 2 or 5, wherein the path switching  
control circuit switches the switch to the sub-path  
output when the amount of level is equal to or larger  
than the predetermined amount of level and at the same  
35    time the detected amount of movement is equal to or  
larger than a second amount of movement, which is larger  
than the first amount of movement.

9. A signal processor for multiple gradations, as set forth in claim 3 or 6, wherein the path switching control circuit switches the switch to the sub-path output when the amount of level is equal to or larger than the predetermined amount of level and at the same time the detected amount of movement is equal to or larger than a third amount of movement, which is between the first amount of movement and the second amount of movement.

10. A signal processor for multiple gradations, as set forth in any one of claims 1, 2, 3, 5 and 6, wherein the path switching control circuit comprises a parameter operation circuit for calculating a parameter by performing a predetermined operation on the amount of level and the detected amount of movement and switches the switch to the sub-path output when the parameter is equal to or larger than a predetermined parameter value.

11. A signal processor for multiple gradations, as set forth in any one of claims 1 to 10, wherein the path switching control circuit switches the switch so that the main path is selected even when the path switching control circuit is bound to switch the switch to the sub-path output, if the neighboring pixel has already selected the sub-path.

12. A signal processor for multiple gradations, as set forth in any one of claims 1 to 11, wherein the superposing control circuit makes the selection of the plural subfield coding circuits in the superposing circuit for each primary color signal differ one from another, sequentially, for each of neighboring transverse lines on the display screen.

13. A signal processor for multiple gradations, as set forth in any one of claims 1 to 11, wherein the superposing control circuit makes the selection of the plural subfield coding circuits in the superposing circuit for each primary color signal differ, sequentially, for each of neighboring longitudinal lines

on the display screen.

14. A signal processor for multiple gradations, as set forth in any one of claims 1 to 11, wherein the superposing control circuit makes the selection of the plural subfield coding circuits in the superposing circuit for each primary color signal differ for each of neighboring transverse and longitudinal lines, that is, in a staggered pattern, on the display screen.

15. A signal processor for multiple gradations, as set forth in any one of claims 12 to 14, wherein the superposing control circuit makes the selection of the plural subfield coding circuits in the superposing circuit for each primary color signal differ further for each of field.

16. A signal processor for multiple gradations, as set forth in any one of claims 1 to 11, wherein there are comprised two sets of the plural subfield coding circuits, and wherein the superposing control circuit makes the selection of the plural subfield coding circuits in the superposing circuit differ sequentially for each group of two transversely neighboring color pixels and controls so that the position is shifted by one color pixel for each transverse display line and further the position is shifted by one color pixel for each field on the display screen on which three color pixels making up the pixels are arranged.